

Table of Contents

Pretest	1
Pretest Questions	1
Key to Pretest Questions	29
Chapter 1: Introductory Anatomical Terms and Physiological Concepts	37
Directional Terms	37
Anatomical Position	38
Superficial Landmarks	42
Body Quadrants	49
Abdominopelvic Regions	51
Body Planes	56
Homeostasis	58
Negative Feedback Mechanism	58
Positive Feedback Mechanism	59
Chapter Problems and Solutions	60
Problems	60
Answers and Solutions	61
Supplemental Chapter Problems	63
Problems	63
Answers	64
Chapter 2: The Chemistry of Anatomy and Physiology	65
Atoms	65
The Periodic Table	66
Ions	67
Polyatomic Ions	69
Isotopes	71
Radioactive Isotopes	72
Organic Molecules	74
Carbohydrates	76
Lipids	76
Proteins	77
Nucleic Acids	77
pH Concepts	78
Buffers	79

Chapter Problems and Solutions	80
Problems	80
Answers and Solutions	81
Supplemental Chapter Problems	81
Problems	81
Answers	82
Chapter 3: The Cell	83
The Cell Organelles	83
Protein Synthesis	83
The Cell Membrane	84
Osmosis	85
Cell Reproduction	88
Chapter Problems and Solutions	91
Problems	91
Answers and Solutions	91
Supplemental Chapter Problems	92
Problems	92
Answers	93
Chapter 4: Cells and Tissues	95
The Four Tissue Groups	95
Epithelial	96
Muscular	97
Neural	98
Connective	98
Body Membranes	103
Chapter Problems and Solutions	105
Problems	105
Answers and Solutions	105
Supplemental Chapter Problems	106
Problems	106
Answers	106
Chapter 5: The Integumentary System	109
The Skin	109
Hair	110
Nails	110
Glands	111

Chapter Problems and Solutions	113
Problems	113
Answers and Solutions	113
Supplemental Chapter Problems	114
Problems	114
Answers	114
Chapter 6: The Axial Skeletal System	115
The Skull	115
Bones of the Cranium	115
Bones of the Face	117
Internal Ear Bones	119
The Hyoid Bone	119
Foramen of the Skull	120
The Thoracic Cage	122
The Sternum	122
The Ribs	122
The Vertebral Column	123
Chapter Problems and Solutions	126
Problems	126
Answers and Solutions	127
Supplemental Chapter Problems	127
Problems	127
Answers	128
Chapter 7: The Appendicular Skeletal System	129
The Pectoral Girdle and Upper Limbs	129
The Pelvic Girdle and Lower Limbs	133
Chapter Problems and Solutions	138
Problems	138
Answers and Solutions	138
Supplemental Chapter Problems	139
Problems	139
Answers	139
Chapter 8: The Muscular System	141
Select Muscles of the Face	141
Select Muscles of the Arm	143
Select Muscles of the Leg	145
Select Muscles of the Torso	147

Muscle Structure	150
Chapter Problems and Solutions	152
Problems	152
Answers and Solutions	152
Supplemental Chapter Problems	153
Problems	153
Answers	153
Chapter 9: General Nervous System	155
Neurons	155
The Impulse	156
One-Way Transmission	159
All-or-None Principle	160
Threshold	160
The Neuroglial Cells	161
Nerves	161
Chapter Problems and Solutions	163
Problems	163
Answers and Solutions	163
Supplemental Chapter Problems	164
Problems	164
Answers	164
Chapter 10: The Central Nervous System	167
The Brain	167
The Brain's Five Major Divisions	169
Other Structures of the Brain	171
The Spinal Cord	175
Nerve Plexuses	176
Transverse View of the Spinal Cord	177
Protecting the Central Nervous System	179
Chapter Problems and Solutions	180
Problems	180
Answers and Solutions	181
Supplemental Chapter Problems	182
Problems	182
Answers	182
Chapter 11: The Peripheral Nervous System	185
The Spinal Nerves	186
The Cranial Nerves	187

Chapter Problems and Solutions	190
Problems	190
Answers and Solutions	191
Supplemental Chapter Problems	192
Problems	192
Answers	192
Chapter 12: The Five Senses	195
Introducing the Five Senses	195
The Tongue	196
The Pathway of Light into the Eyes	197
The Pathway of Sound Waves into the Ear	200
Chapter Problems and Solutions	204
Problems	204
Answers and Solutions	204
Supplemental Chapter Problems	205
Problems	205
Answers	206
Chapter 13: The Endocrine System	207
The Pituitary Gland	207
Other Endocrine Glands	209
Chapter Problems and Solutions	213
Problems	213
Answers and Solutions	214
Supplemental Chapter Problems	214
Problems	214
Answers	215
Chapter 14: The Blood	217
Blood Composition	217
Red Blood Cells	218
Erythrocyte Structure	218
Erythrocyte Life Span	219
White Blood Cells	219
Leukocyte Response	220
Platelets and Platelet Response	221
Blood Types	223
Glycolipids and Blood Typing	224
Donating Packed Cells	224

Donating Whole Blood	228
Donating Plasma	230
The Rh Factor	233
Chapter Problems and Solutions	236
Problems	236
Answers and Solutions	237
Supplemental Chapter Problems	237
Problems	237
Answers	238
Chapter 15: The Heart and Blood Vessels	239
Structure of the Internal Heart	239
Other Features of the Internal Heart	243
The Conducting System of the Heart	244
The Electrocardiogram (ECG)	245
More Heart Information	246
Blood Vessels (Arteries)	247
Blood Vessels (Veins)	254
More Blood Vessel Information	261
Chapter Problems and Solutions	262
Problems	262
Answers and Solutions	262
Supplemental Chapter Problems	263
Problems	263
Answers	264
Chapter 16: The Lymphatic System	265
Lymph and Lymph Vessels	265
Lymph Organs	265
The Lymphatic System and Defense	266
Passive and Active Immunity	268
Chapter Problems and Solutions	270
Problems	270
Answers and Solutions	271
Supplemental Chapter Problems	271
Problems	271
Answers	272
Chapter 17: The Respiratory System	273
The Respiratory Organs	273
The Process of Inhaling and Exhaling	275

The Chloride Shift	277
The Control Mechanisms of Breathing	280
Abnormal Breathing	281
Protecting the Respiratory System	282
Chapter Problems and Solutions	283
Problems	283
Answers and Solutions	284
Supplemental Chapter Problems	284
Problems	284
Answers	285
Chapter 18: The Digestive System	287
The Mouth	287
Teeth	287
Salivary Glands	288
The Tongue	288
The Uvula	288
The Stomach	290
The Esophageal Sphincter	291
The Gastric Rugae	291
Hydrochloric Acid, Pepsinogen, Pepsin	291
Pyloric Sphincter	292
The Small Intestine	292
The Duodenum	293
The Jejunum	294
The Ileum	294
The Pancreas	296
Buffers	296
Digestive Enzymes from the Pancreas	296
The Liver and Gallbladder	297
The Large Intestine	300
Summary of Digestive Enzymes	302
Hormones of the Digestive System	303
Chapter Problems and Solutions	304
Problems	304
Answers and Solutions	305
Supplemental Chapter Problems	305
Problems	305
Answers	306

Chapter 19: Metabolism	307
Catabolism	307
Anabolism	308
Metabolism of Carbohydrates	308
Metabolism of Protein	309
Metabolism of Fat	310
Essential and Nonessential Products	313
Metabolism of Other Nutritional Products	314
Vitamins and Metabolism	315
Cholesterol and Metabolism	317
Chapter Problems and Solutions	318
Problems	318
Answers and Solutions	319
Supplemental Chapter Problems	319
Problems	319
Answers	320
Chapter 20: The Urinary System	321
The Functions and Structures of the Urinary System	321
The Internal Structures of the Kidney	323
Blood Vessels Associated with the Nephron	326
Function of the Nephron	327
The Urinary Bladder	330
Other Functions of the Kidneys	331
Chapter Problems and Solutions	333
Problems	333
Answers and Solutions	333
Supplemental Chapter Problems	334
Problems	334
Answers	334
Chapter 21: The Reproductive System	335
The Male Reproductive System and Sperm Cells	335
The Three Glands of the Male Reproductive System	336
Structure of Sperm Cells	337
Hormones and Nerves Associated with the Male Reproductive System	337

The Female Reproductive System and Egg Cells	339
Sperm Cells Fertilizing the Egg	339
The Fertilized Egg	340
Hormones Associated with the Female Reproductive System	341
General Reproductive System Information	342
Chapter Problems and Solutions	343
Problems	343
Answers and Solutions	344
Supplemental Chapter Problems	344
Problems	344
Answers	345
Customized Full-Length Exam	347
Index	371

